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The Economics of 1992 and the Food Industry:

A Review of the Conceptual Issues and Available Results

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1. Introduction

Currently, many observers in both the European Community (EC) and US are grappling with the potential implications for the food industry of the planned completion of the EC internal market by 1993. It seems useful at this stage, therefore, to outline some of the findings concerning the impact of the 1992 programme on the food industry and to review the conceptual basis for such results. The starting point of the discussion is an outline of the broad headings under which EC integration can be examined. Much of the literature on 1992 draws a distinction between the micro and macroeconomic impacts, and whilst some of the estimates of the macroeconomic effects are based on the aggregation of sectoral effects, the distinction is useful in pinning down the general and specific impact of 1992 on the food industry.

At the macroeconomic level, completion of the internal market is expected to result in an increase in economic growth. For example, the European Commission (1988), in what is popularly known as the Cecchini Report, has estimated that removal of internal barriers to trade will result in a once-off increase in EC gross domestic product (GDP) of between 2.5 and 6.5 per cent. Baldwin (1989) argues that there may be more dynamic growth effects that were ignored in the Commission's estimates which will generate a permanent increase in EC growth rates. It is important, therefore, to lay out the economic reasoning for increases in economic growth and its likely implications for the EC food industry.

At the microeconomic level, the process of harmonisation and removal of non-tariff barriers is likely to have a number of effects at the industry level. *A priori*, it is expected that completion of the internal market will increase the volume of intra-EC trade, generate

more competition in national markets and result in the fuller realisation of economies of scale at the firm level. Customs union theory also suggests that the removal of internal barriers to trade may generate either an increase or a decrease in extra-EC imports.

As well as the above effects, it is argued that completion of the internal market will allow firms to act on an integrated, EC-wide basis, rather than on a fragmented, national market basis. *A priori*, this will remove the market power that firms have in a particular market and substitute it with an EC average degree of market power within any particular industry. In principle, this ought to be pro-competitive as the extent to which firms can maintain prices in domestic markets will be reduced. Smith and Venables (1988) argue that this aspect of 1992 is, "...much closer to the spirit of what is meant by 'completing the internal market' than is a mere reduction in trade barriers..." (p.1502)

Given the distinction between the macro and microeconomic effects of 1992, the remainder of the paper is concerned with evaluating these for the EC food industry. Section 2 focusses on the impact of an increase in EC GDP on the demand for food. Whilst no estimates of this effect have been published, a simple "back-of-the-envelope" experiment is conducted using a range of estimates for the expected increase in EC GDP. Section 3 considers the microeconomic estimates for the impact of 1992, reference being made to the European Commission's results which appear to be the most wide-ranging to date. Finally, in Section 4 some suggestions are put forward for ways in which estimates of the effects on the food industry could be improved.

2. Macroeconomic Effects of 1992

As noted above, the European Commission has estimated that the efficiency effects of reducing internal trade barriers will result in a one-time increase in EC GDP of between 2.5 and 6.5 per cent[1]. These estimates are based on the summation of microeconomic gains[2] across sectors for seven EC countries (Belgium, France, Germany, Italy, Luxembourg, the Netherlands and UK, hereafter denoted as EC7) who, in 1985, accounted for 88 per cent of EC12 GDP. As Peck (1989) points out, implicit in the estimates are the assumptions that resources will be fully employed as structural change occurs and that there are no political obstacles to re-structuring.

Although the Commission's estimates are based on the summation of microeconomic effects, it is possible to treat the gains at an aggregate level. Following Baldwin and Dornbusch (1989), suppose that the EC-wide relation between GDP and inputs can be characterised by the following Cobb-Douglas type function:

$$GDP = jK^{a+b}L^{1-a}$$

where K is the capital stock, L is the amount of labour employed, and j is an efficiency parameter. The parameter b reflects the extent of aggregate scale economies, i.e. if $b>0$, there are scale effects. Traditional growth theory assumes that $b=0$, increases in GDP being

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[1] Differing ranges in the effects on GDP are reported by various authors. The range noted here is that recorded in the introduction to the Commission's report and quoted by Baldwin.

[2] It should be noted that the Commission did run some macroeconometric forecasts indicating an increase in GDP of 4.5 per cent in the medium-term.

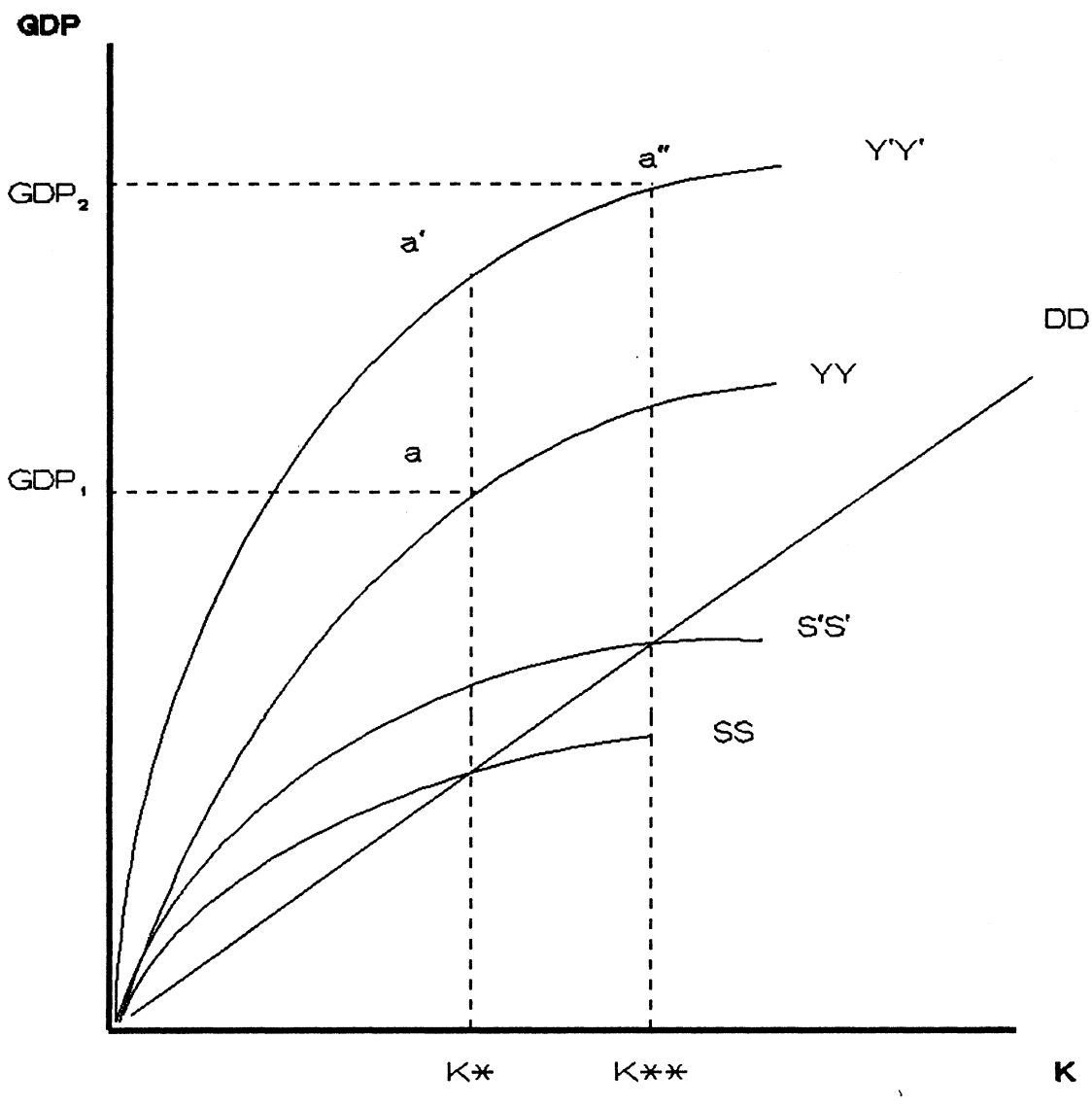
explained in terms of exogenous technical progress, i.e. the production function exhibits diminishing marginal returns to capital, growth being determined by a shift in the function.

In Figure 1, the curve YY is drawn upon the assumption that capital is varied, labour held constant, and there are diminishing returns to capital. SS is drawn assuming that the economy invests some constant fraction of GDP. Some investment goes towards servicing the depreciation of the existing capital stock, the remainder being a net addition capital. In equilibrium, investment is entirely devoted to replacing existing capital, i.e. at K^* where DD crosses SS, DD being drawn for a constant rate of depreciation. GDP_1 is therefore the equilibrium growth rate for the capital stock K^*.

Baldwin and Dornbusch argue that the Commission has estimated a one-time change in the value of the parameter j which shifts up the production function to $Y'Y'$ and hence the investment function to $S'S'$. With the existing capital stock, growth is from a to a', however there is an additional boost to growth from a' to a'' as the economy moves towards the new equilibrium capital stock K^{**}.

If there are economy-wide returns to scale, then the function YY in Figure 1 will have a less pronounced curvature and so the new steady-state capital stock will be even larger and hence the increase in GDP is greater. Baldwin describes these effects as the medium-term impact of 1992, which he argues the Commission underestimated. However, this is still a once-off effect, amplified by the impact of scale economies, as the economy ultimately settles to a new steady-state capital stock K^{**}. For differing estimates of the output-capital elasticity (a+b), Baldwin has calculated, through a simulation model, both the static and medium-term effects of 1992. Overall his results indicate that with economies of

Figure 1 EC Production Function



scale, EC GDP will grow by between 3.4 and 8.7 per cent[3], suggesting that the Commission underestimated the static effects by about 30 per cent.

Suppose, however, that the parameters in the production function are no longer constrained to sum to less than 1, rather $(a+b)\geq 1$. In the case of $(a+b)>1$, economies of scale are sufficiently important to generate accelerating economic growth, which seems implausible. However, Romer (1987) has argued that $(a+b)\approx 1$, in which case a permanent increase in the growth rate can be sustained as the capital-labour ratio never reaches a stable equilibrium. Allowing for the long-term growth effects, Baldwin estimates that completion of the internal market would increase discounted future EC GDP by between 11 and 35 per cent[4].

Given the various forecasts of the impact of 1992 on EC GDP, it ought, in principle, to be possible to calculate likely demand shifts in the EC food industry. Assuming increases in GDP are equivalent to increases in income, Table 1 contains the results of a simple experiment where, for both the Commission and Baldwin estimates of the once-off increase in GDP, the impact on the EC food industry post-1992 is calculated, given a forecast value of food industry output in 1992 (Euromonitor) and an estimate[5] of the EC's elasticity of food expenditure with respect to GDP.

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[3] This range is based on a "low" estimate of economies of scale. See Baldwin, Tables 2 and 3.

[4] It should be noted that Baldwin's estimates have been criticised by Venables (1989) as being very sensitive to assumptions about the savings ratio.

[5] This is a crude estimate based on a log-linear regression of EC12 food expenditure per capita on EC12 GDP per capita.

Table 1 Forecast Changes in EC Food Industry

		Change in EC GDP (%)	EC Food[1] Industry ($billion)
Commission Estimates		2.5	557.9
		6.5	571.5
Baldwin Estimates[2]	Low Estimate	3.4	560.9
		8.7	579.0
	High Estimate	5.5	568.1
		15.7	602.9
Euromonitor Estimates		–	559.1
		–	–

1. Based on Euromonitor forecast for 1992 of $549.4 billion and assuming an EC elasticity of 0.62.
2. See Baldwin for estimates based on high and low values for the output-capital elasticity (a+b).

The results suggest that the EC food industry will experience a once-and-for-all increase in sales in the range $8.5 billion to $53.5 billion, i.e a growth of 1.5 to 9.7 per cent, which compares to a forecast annual average growth rate of 1.1 per cent over the period 1988-92. Clearly such estimates are open to challenge, and perhaps most important, aggregate figures for the EC hide structural differences in the demand for food across the member states. Whilst all EC countries show a declining proportion of household expenditures being accounted for by spending on food, tobacco and alcohol products, there are marked differences in food expenditures as shown in Table 2. These differences largely reflect the relative stages of economic development in the Community and can be explained by reference to Engel's Law. *A priori*, one would expect the impact of 1992 to have less of an effect in the most developed EC states, although expenditure effects are likely to be

present as increasing incomes shift food purchasing patterns towards higher-quality products and eating away from home.

Table 2 Share of Consumer Expenditure on Food, Beverages and Tobacco in EC12 (%)

	1979	1987
Belgium	22.5	20.6
Denmark	26.0	22.6
France	22.4	20.1
Germany	20.0	16.7
Greece	36.5	38.1
Ireland	42.4	41.8
Italy	32.5	23.5
Luxembourg	22.7	22.5
Netherlands	22.2	18.7
Portugal	_	37.1
Spain	_	26.1
United Kingdom	23.0	17.9

Source: Agricultural Situation in the Community, 1980, 1988.

3. Microeconomic Impact of 1992

(i) Importance of Trade Barriers

In examining the microeconomic impact of 1992, it is useful first to consider the nature of remaining trade barriers within the EC and their importance in the food industry. Barriers to trade are normally divided into two categories, tariffs and non-tariff barriers, but

given that internal tariffs (bar Monetary Compensatory Amounts, MCAs) have largely been eliminated within the Community, the focus of the Commission's 1985 White Paper was on the latter type of barrier. Specifically, the Commission identified three types of non-tariff barrier; physical frontiers at intra-EC customs posts, technical frontiers such as differing product standards, and fiscal frontiers in the form of different levels of value-added tax.

In theory, non-tariff barriers to trade of this type will have two effects. First, they impose a cost on consumers in an importing country through higher prices, and unlike a tariff, there is no offsetting government revenue. Higher prices are maintained as either inefficient or monopolistic domestic firms are protected from import competition. Second, exporting firms bear the cost of dealing with the non-tariff barriers. In principle, therefore, the impact of such barriers can be measured in terms of both their cost and also the extent to which prices in the EC diverge from the law of one price.

In the case of the EC food industry, a study of the cost of barriers was conducted on behalf of the Commission by Groupe Mac[6]. They studied ten product sectors covering; biscuits, ice-cream, chocolate, beer, mineral water, pasta, soup, baby-food, non-alcoholic beverages and spirits, which accounted for 17.6 per cent of EC food expenditures in 1985[7]. For these ten products, a total of 218 non-tariff barriers were identified and classified into five types as shown in Table 3.

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[6] A French-based consultancy firm.

[7] This covered Belgium, Denmark, Germany, France, Italy, Netherlands and the UK.

Table 3 Non-Tariff Barriers in the EC Food Industry

	Number of Barriers	% of Total
Specific Import Restrictions	64	29.4
Packaging/Labelling Laws	68	31.2
Specific Ingredient Restrictions	33	15.1
Content/Denomination Regulations	39	17.9
Fiscal Discrimination	14	6.4
Total	218	100.0

Source: Groupe Mac

From the 218 barriers, 15 were selected for further analysis, and Table 4 summarises Groupe Mac's estimates for cost savings from removing these barriers. The total effect from their removal is calculated to be in the range 440 to 975 million ECU per annum, which represents between 0.66 and 1.5 per cent of the industry's turnover. A number of comments can be made on the results. First, for the 15 barriers chosen, 6 accounted for the bulk of the gains, and of these, the European Court has already ruled on beer and pasta purity. Second, the difference between direct and total benefits is defined to be indirect benefits, i.e. increased competition, restructuring and increased trade, however, the report only quantified these effects for the German beer industry, hence the bulk of the estimates are based on the assumption of lower material costs. Third, the benefits from removing the remaining 200 barriers appear to have been extrapolated from the pilot sample.

Clearly there are many barriers to trade in food products and of the 300 Commission directives regarding barrier removal, 105 relate to food and agriculture. However, the Groupe Mac estimates of their height have to be regarded as both partial and "guesstimates". As Swinbank (1990a) points out, "too much credence should not be placed

on the numbers generated", and he notes that, "on occasions the presentation is so glib and superficial that serious doubts are bound to be raised about the quality of the underlying research".

Table 4 Effects of Non-Tariff Barrier Removal in Food Industry (million ECU/annum)

Barrier	Country	Direct Benefit	Total Benefit
Beer Purity	Germany	15-20	105-235
Pasta Purity	Italy	35-100	35-100
Aspartame	France	0-10	0-10
Vegetable Fat (Chocolate)	France	190-235	190-235
Vegetable Fat (Ice-Cream)	Germany	75-100	75-100
Beverage Containers	Denmark	<1	<1
Beer Wort Tax	UK	<1	<1
Health Regulations (Baby Food)	Spain	<1	<1
Bulk Transport (Mineral Water)	France	<1	<1
Saccharine	Italy	20-45	20-45
Chlorine (Biscuits)	UK	<1	<1
Soup Labelling	Spain	<5	<5
German Water	Germany	<1	<1
Plastic Containers	Italy	15-50	15-50
Double Inspection	Spain	<1	<1
Other Barriers	_	0-200	0-200
Total	_	350-775	440-975

Source: Groupe Mac.

Table 5 Price Dispersion[1] in EC Food Products

Product	Without Taxes			With Taxes		
	1975	1980	1985	1975	1980	1985
Rice	17.95	17.98	9.87	20.38	20.43	11.60
Flour, Other Cereals	20.79	7.37	15.74	22.94	12.52	17.85
Bread, Cakes and Biscuits	12.83	12.96	11.50	15.81	17.16	15.17
Noodles, Macaroni, Spaghetti	12.40	11.94	8.86	13.78	14.34	11.01
Beef	21.27	17.55	11.32	23.99	19.96	14.32
Veal	10.59	23.29	16.45	13.67	21.93	15.94
Pork	10.95	9.49	14.96	14.24	13.37	20.53
Mutton, Lamb, Goat Meat	23.85	18.20	10.28	26.48	20.07	12.30
Poultry	11.61	9.27	10.46	14.88	9.74	14.58
Delicatessen	17.45	12.38	21.00	20.73	16.02	23.58
Meat Preparations, Other Meat Products	15.10	18.04	11.17	15.58	22.60	14.48
Fish and Other Seafood	13.72	13.26	13.54	16.54	16.53	15.41
Fresh Milk	12.28	13.11	15.51	14.01	12.90	16.90
Milk, Preserved	18.37	19.81	24.60	19.00	16.95	22.23
Cheese	11.71	12.41	11.33	14.08	18.68	13.78
Eggs	8.87	7.22	15.60	11.54	10.60	17.61
Butter, Animal, Vegetable Fats	18.64	15.44	5.39	20.83	13.80	10.05
Edible Oils	23.29	22.15	22.35	25.44	24.13	23.24
Fresh Fruits	24.34	16.76	16.02	28.43	18.27	19.01
Fruits Dried, Frozen, Preserved, and Juice	15.81	10.91	14.57	18.08	13.69	19.09
Fresh Vegetables	19.29	25.48	24.99	23.54	30.37	27.59
Vegetables Dried, Frozen, Preserved, Soups	14.18	16.47	12.08	16.66	20.36	20.06
Potatoes	27.55	27.79	28.41	31.72	31.71	29.14
Sugar	14.40	26.27	17.94	10.55	33.12	19.19
Coffee and Cocoa	20.33	17.84	10.81	28.97	27.39	14.18
Tea	41.93	30.87	26.94	46.02	37.27	23.04
Chocolate and Confectionary	26.61	22.27	19.21	33.09	25.99	16.57
Jams, Honey, Syrups, Ice-Cream	16.59	10.67	16.83	16.95	12.43	19.89
Mineral Water, Soft Drinks	17.15	25.98	24.87	21.68	31.60	33.15
Liqueurs and Spirits	14.80	11.55	18.25	33.47	47.06	37.24
Wine and Cider	15.90	33.36	15.88	22.64	58.86	41.54
Beer	24.26	25.71	20.94	26.55	34.30	41.45
Cigarettes	10.39	19.60	15.84	49.61	51.73	42.13
Other Tobacco Products	35.35	35.44	23.01	28.38	34.41	43.56

Source: Eurostat
1. Standard deviation of prices relative to the EC average.

As well as the Groupe Mac study, the Commission also estimated the extent of price dispersion across various product groups for the years 1975, 1980 and 1985, using price data collected by Eurostat[8]. The results for food and related products are shown in Table 5, where the figures reported measure the standard deviation of prices relative to the Community average[9]. The data suggest that there is quite a large difference in food product prices between member states, even if differences in transport and marketing costs are taken into account. The results also indicate that a significant part of the price differences is due to varying levels of indirect tax. The Commission concludes that, "It is therefore reasonable to assume that the removal of non-tariff barriers will have a direct impact on the dispersion of prices" (p.122).

(ii) Removal of Trade Barriers

As noted earlier, the microeconomic effects of 1992 can be divided into two basic areas. First, removal of non-tariff barriers is expected to generate trade and associated gains/losses, which can be analysed using partial equilibrium, customs union theory. Second, following the removal of barriers, there may be a market integration effect generated by the increased realisation of economies of scale and greater competition between firms. As Cox and Harris (1985) have shown in their modelling of the US-Canada free trade agreement, when economies of scale and imperfect competition are taken into account, the market

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[8] This data is drawn from the five-year price review made by Eurostat used to calculate purchasing power parities.

[9] The absolute price differences between certain countries tend to be even larger.

integration effects of trade liberalisation may be considerably higher than those predicted by neoclassical trade theory.

(a) Direct Trade Barrier Effects

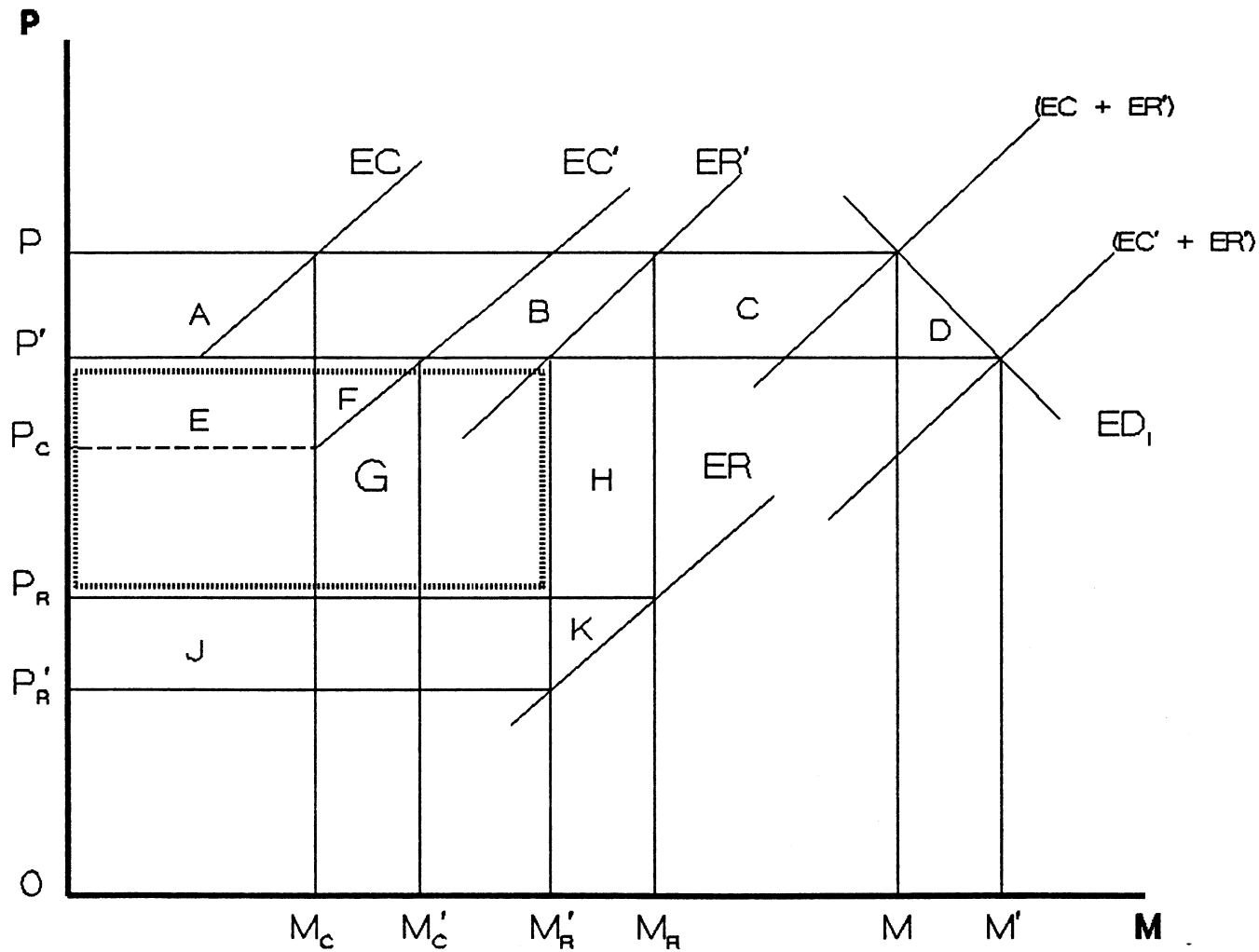
The Commission in its evaluation of 1992 has basically followed this dichotomy of effects. Focussing first on the orthodox gains/losses from removal of trade barriers, the analysis assumes that markets are perfectly competitive, goods are homogeneous and firms' cost functions exhibit non-increasing returns to scale. The basic result of removing trade barriers can be considered in a three-country framework where one EC country, I, imports from the rest of the Community, C, and the rest of the world, R.

Figure 2 illustrates the case using excess supply and demand curves. ED_I is the import demand curve for country I, whilst (EC+ER′) is the aggregate export supply curve for the remaining EC countries and the rest of the world. It is assumed that a per unit common external tariff is levied on imports from R, shifting up its supply curve from ER to ER′. The initial equilibrium is one where the market clears at price P and quantity M, with I importing OM_C from C and OM_R from R. Country I earns tariff revenue of the areas (A+B+H+G), but necessarily foregoes tariff revenue on imports from C. If the non-tariff barriers are removed, the export supply curve shifts to EC′, moving the aggregate supply curve to (EC′+ER′). The common external tariff is maintained, inclusive of any remaining non-tariff barriers. Hence the new equilibrium is at price P′ and quantity M′, imports by I from C increase to OM_C' and fall to OM_R' from R.

From this comparative statics exercise a number of welfare changes can be identified:

- consumers in country I gain surplus made up of the areas (A+B+C+D), whilst there is

Figure 2 Removal of Trade Barriers: Partial Equilibrium Effects



a net loss in tariff revenue of the area (A+B+H)-J[10]. Hence the net welfare gain to I is (C+D-H+J); area C is the terms of trade gain on the original level of imports from C (i.e. the lower price P′ prevails); area D is the gain on additional imports from C, i.e. **trade creation** as production in I is replaced by cheaper imports from C; area H is **trade diversion** as imports from R are replaced by more expensive imports from C, i.e a terms of trade loss; and area J is a terms of trade gain in getting imports from R at a lower price.

- for the exporters, Community firms in C gain producer surplus of (E+F), where E is the terms of trade gain on existing exports to I and F is the gain from extra exports to I. Rest of the world firms lose producer surplus of (J+K) which is a terms of trade loss.

Clearly the welfare effects outlined are highly sensitive to a number of assumptions. First, the removal of non-tariff barriers is assumed not to affect the rest of the world's supply curve ER′. It might be argued, for example, that harmonisation of product standards will reduce the variable costs[11] of exporting to the EC, in which case there may be **external trade creation**. Equally, if the prospect of "fortress Europe"[12] is to be believed, then the level of trade diversion may be greater. Second, welfare changes are sensitive to the assumed values of both the common external tariff and supply and demand elasticities. Third, a market structure of perfect competition is assumed, which will result in an over-estimate of the welfare gains and also a different distribution of the gains if in fact markets

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[10] Whilst not shown here, there is also a loss in producer surplus in I as domestic firms' output declines in the face of imports from C.

[11] Meeting harmonised standards may of course result in firms incurring initial sunk costs.

[12] A phrase originally due to a vice-president of the EC, de Clerq.

are imperfectly competitive. Fourth, the model is partial equilibrium in nature, consequently, cross-price and income effects are ignored[13].

In focussing on the EC7, the Commission calculated the direct gains from removing trade barriers in two stages[14]:

- first, in **stage 1**, the trade and welfare effects were derived as a weighted average of the gains for each of the seven EC countries. For a sample of 65 final goods sectors (19 relating to food products) based on the NACE, 3-digit classification[15], the effect on prices from removing tariff barriers was calculated, based on estimates of the cost reductions and external estimates of the relevant price elasticities[16]. From this, changes in intra-EC trade flows were estimated, along with the associated changes in consumer and producer surplus. Although allowance was made for the possibility that harmonisation of standards will result in an increase in extra-EC trade, this was not the case for food products.

- in **stage 2**, the EC is treated as a single economic entity trading with the rest of the world. Focussing on 44 sectors from the NACE classification, (5 relating to the food industry), the effects of EC-wide cost reductions on external trade were estimated. This estimate takes into account the impact on final goods of cost reductions in intermediate goods' trade by using the EC input-output tables.

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[13] The authors of the Commission's report do acknowledge these weaknesses.

[14] Estimates made by Cawley and Davenport (1988).

[15] A Community classification similar to the SIC classification system.

[16] See Cawley and Davenport for full coverage of the elasticity data.

The results of **stages 1** and **2** are outlined in Tables 6, 7 and 8, based on 1985 data for the EC food industry. Table 6 lists the percentage cost reductions assumed to occur as a result of the removal of non-tariff barriers. Column (i) relates only to border formalities and is based on a consultancy study by Ernst and Whinney (1987), whereas column (ii) takes account of other barriers such as product standards, the estimates being based on a business survey conducted by the Commission. The data in column (iii) are scaled down estimates of the effects of cost reductions in intermediate goods based on the share in EC output of intra-EC trade in intermediates. Also included in column (iii) are the effects of increased realisation of scale economies in the production of intermediates and reductions in the costs of services. Finally in column (iv), price reductions for agricultural products have been incorporated.

A number of comments can be made on this data. First, the effects of removing border formalities in food products are estimated to be less than the average for all industries, which is perhaps surprising, whilst inclusion of factors such as product standards increases the impact of reducing non-tariff barriers. It is not clear from the Commission's report whether the removal of MCAs, which affect the relevant processed products, have been assumed in the calculation. Second, once the impact of cost reductions in the intermediate sector is considered, the impact on the food sector is above average for meat and dairy products. Again it is not clear whether this estimate includes the removal of MCAs on agricultural products, although the assumed reduction of agricultural prices would seem to imply this.

Table 6 Estimated Effects of Removing Barriers for EC Food Industry

	Cost Reduction (%) Stage 1		Cost Reduction (%) Stage 2	
	(i)	(ii)	(iii)	(iv)
ats, Preserves	1.0	2.2	0.9	4.0
Dry Products	1.0	2.2	1.1	4.3
Other Foods	1.0	2.2	1.1	2.6
Beverages	1.0	2.2	1.3	1.7
Tobacco Products	1.0	2.2	0.5	0.7
Average Across All Industries	1.6	1.9	2.4	3.0

Source: EC Commission
(i) Final goods, border formalities
(ii) Final goods, border formalities and other barriers
(iii) Effect of cost reductions in intermediate goods (exc. agriculture)
(iv) Column (iii) plus agriculture.

Table 7 reports the **stage 1** calculation, focussing on changes in intra-EC and extra-EC imports along with the static welfare gains. The results indicate fairly small changes in intra-EC trade in food products relative to the average for all products and smaller than the changes predicted for agriculture. In the case of extra-EC imports, where products are either directly or indirectly linked to CAP regimes, the change in imports is assumed to be zero. For the remaining drink and tobacco products, there are quite significant declines in imports, suggesting trade diversion. Overall, the predicted welfare gains of **stage 1** are small for the EC food industry.

Table 7 Effects of Removing Trade Barriers on EC Food Industry: Stage 1

	Change in Intra-EC Imports (%)		Change in Extra-EC Imports (%)		Welfare Gains (billion ECU)	
	(i)	(ii)	(i)	(ii)	(i)	(ii)
Vegetable/Animal Oils	1.0	2.4	0.0	0.0	0.0	0.1
Meat Preparation	0.7	1.7	0.0	0.0	0.1	0.3
Dairy Products	0.7	1.6	0.0	0.0	0.1	0.2
Fruit/Vegetable Processing	0.9	2.0	0.0	0.0	0.0	0.1
Fish Processing	1.0	2.3	0.0	0.0	0.0	0.0
Grain Milling	0.8	1.8	0.0	0.0	0.0	0.0
Pasta	0.6	1.4	0.0	0.0	0.0	0.0
Starch Products	0.8	1.9	0.0	0.0	0.0	0.0
Bread, Flour	0.6	1.4	0.0	0.0	0.0	0.0
Sugar Refining	1.0	2.2	0.0	0.0	0.0	0.0
Cocoa, Chocolate, Sugar	0.7	1.6	0.0	0.0	0.0	0.1
Animal Food	0.8	1.8	0.0	0.0	0.0	0.0
Other Food	0.8	1.8	0.0	0.0	0.0	0.1
Ethyl Distilling	1.3	2.9	-3.0	-7.2	0.0	0.0
Wine	2.1	4.9	-1.8	-4.3	0.0	0.0
Cider, Perry	1.8	4.2	-2.3	-5.5	0.0	0.0
Brewing	1.2	2.9	-2.9	-7.2	0.0	0.0
Soft Drinks	1.1	2.4	-3.5	-7.2	0.0	0.0
Tobacco	0.8	2.0	0.0	0.0	0.0	0.0
Agriculture	6.4	5.0	-1.8	-1.4	0.4	0.3
Average Across All Industries	3.7	4.5	-2.2	-2.6	---	---

Source: EC Commission
(i) and (ii) refer to the different estimates of cost reduction.

The main question concerning these results is the assumption concerning extra-EC imports of products directly/indirectly affected by the CAP. First, if some part of the increase in intra-EC imports of food products is due to the removal of MCAs, *a priori* this is likely to affect the level of extra-EC imports, i.e. a degree of trade diversion will occur if existing tariffs remain in place. Second, some authors argue that with the removal of MCAs, it will be politically infeasible to allow farm prices in some countries to fall so that there will be an increase in the level of protection[17]. Therefore, for certain processed food products the level of extra-EC imports may be expected to fall.

Table 8 Effects of Removing Trade Barriers on EC Food Industry: Stage 2

	% Change in Output		% Change in Extra-EC Imports		Welfare Gains (billion ECU)	
Product	(i)	(ii)	(i)	(ii)	(i)	(ii)
Meats, Preserves	0.4	1.5	0.0	0.0	0.4	1.5
Dairy Products	0.4	1.5	0.0	0.0	0.5	1.8
Other Food	0.4	1.0	0.0	0.0	1.0	2.2
Beverages	0.5	0.6	-1.9	-2.5	0.3	0.5
Tobacco	0.2	0.3	-2.2	-3.2	0.2	0.2
Agriculture	0.4	2.9	0.0	0.0	0.4	2.8
Average Across All Industries	1.3	1.5	-5.7	-7.7	_	_

Source: EC Commission
(i) Excludes agriculture
(ii) Includes agriculture.

[17] See Swinbank (1990b), Josling (1990) and Ichter (1990) for discussion.

In Table 8, the results of the stage 2 calculation are reported for the EC food sector. The results suggest that including agriculture in the intermediates sector increases the impact of barrier removal. Importantly, the results indicate greater welfare gains at **stage 2** compared to **stage 1**, although again a question is raised about the zero impact on extra-EC imports of food products as the reduction in agricultural prices implies something about changes in the CAP.

(b) Market Integration Effects

Compared to the estimation of direct trade effects from removal of trade barriers, there is no general methodology for dealing with the impact on market integration, which follows from the recognition of economies of scale and imperfectly competitive market structures. Following Peck, a useful stylisation of the potential effects of integration can be outlined. Suppose that three firms exist in a particular EC industry, each a monopolist in its domestic market. After 1992, only two firms survive in the EC-wide market, so that with the fuller realisation of economies of scale, prices fall. Also, after market integration, seller concentration declines, i.e. prior to barrier removal, there were three separate monopoly market structures, so that the average degree of concentration as measured by the Herfindahl index was 1, whereas post-integration, the Herfindahl index falls to 0.5, assuming equal market shares for the two firms. Therefore, it is argued that the two firms will compete more effectively with each other, reducing "X"-inefficiency and generating a further reduction in prices.

Clearly such a result is sensitive to a number of critical assumptions about technology and the nature of competition. First, realisation of economies of scale depends on either

existing plants being operated sub-optimally or/and firms being able to move down their long-run average cost curves. Second, the competition gains are dependent on both the pre- and post-integration games played by firms. Clearly if incumbent firms are able to act as monopolists prior to integration and then play a non-cooperative game in quantities after integration, the resulting Nash-Cournot outcome will drive down prices. However, it is possible for a monopoly market structure to exist with Bertrand price competition[18], hence a move to integration would not generate an increase in price competition and might conceivably result in one firm supplying the whole EC market if products are non-differentiated[19].

In attempting to quantify these effects, the Commission has adopted two methods of calculation. **Method 1** separates out the gains due to economies of scale from the competition effects, whilst **method 2** computes the two gains jointly. Both methods rely on a computable, partial equilibrium model developed by Smith and Venables, which belongs to a class of models developed in the literature on trade under imperfect competition[20]. This procedure first involves the derivation of a model that captures certain features of imperfectly competitive markets. Second, in order to use the model for simulations, it is calibrated with data from external empirical sources such that remaining parameters in the model are consistent with equilibrium in a given period.

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[18] With sunk costs of entry and homogeneous goods, Bertrand price competition will ensure only one firm will enter and remain in equilibrium.

[19] If products are differentiated, more than one firm can exist with Bertrand competition (see Shaked and Sutton, 1983).

[20] See Norman (1989) for a discussion of such models.

Smith and Venables consider a situation where there are multi-brand firms who make decisions on output for a given brand and decisions in relation to the number of brands. The industry equilibrium is similar to that described by Krugman (1979,1980), where firms operate under increasing returns to scale and produce differentiated products, consumers have Dixit and Stiglitz (1977)-type preferences[21] and the trade equilibrium is characterised by intra-industry trade.

The model itself is quite complex so only an intuition is given here[22]. The initial situation is one where the EC market is segmented such that firms price discriminate between markets. Critically, in any firm's first-order condition for profit maximisation, the perceived elasticity of demand for a given product depends on both the price elasticity of demand for the product and the firm's beliefs about the effect of its actions on industry supply. The relevant strategic variable can be either price or quantity, allowing for Bertrand and Cournot outcomes respectively. Firms also choose the number of brands they want to produce, so that the perceived elasticity will depend on the expected response of other firms to a change in the number of brands produced and the impact of a new brand on the demand for existing brands. The latter impact will be affected by the game firms play in any given period, i.e. if it is Bertrand, prices remain constant and output changes, and vice-versa for Cournot.

In equilibrium, if market structure is fixed, then positive profits will be observed, however, with free entry/exit, profits will be driven down to zero, i.e. the monopolistic

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[21] The utility function is one where all available varieties of goods are consumed.

[22] See Venables and Smith (1986) for a full outline of the model.

competition outcome. Once EC integration is allowed for, price discrimination is ruled out as firms have to set a single price and sell into an integrated market. Focussing on a hypothetical industry where Cournot behaviour and a fixed number of brands is assumed, it is useful to describe a simulation through the Smith and Venables model. Initially the non-tariff barriers are removed (i.e. the direct effects of 1992), such that for a given number of firms, intra-EC trade increases, raising competition in each market as the level of seller concentration falls. As a result prices decline, raising consumer surplus and reducing firms' profits, but as sales expand, average costs fall. If exit is allowed, profits return to their pre-integration equilibrium, seller concentration rises, prices increase and consumer gains fall slightly. The actual welfare gains are positively correlated with the extent of scale economies and their impact increases when there is free exit.

The nature of strategic interaction between firms will also affect the welfare outcome. If Bertrand behaviour is assumed, then increased intra-EC trade has less of an effect on prices, hence demand and output change by less than the Cournot case. For fixed numbers of firms, there is less reduction in average costs, whilst for free exit, the smaller price reduction induces less exit and so less realisation of economies of scale. In addition, if firms introduce new brands after removal of trade barriers, they shorten their production runs on existing brands, so there is a trade-off between reduced economies of scale and increased economies of scope. Also smaller reductions in average cost are traded-off against the gains from increased product variety.

Turning to market integration, price differences between segmented markets are assumed to disappear. Prior to integration, firms price discriminate between their home and

foreign markets in order to exploit their market power, i.e. their domestic price-cost margins exceed those in foreign markets and Herfindahl indices are high. After integration, price-cost margins, inclusive of transport costs, must be equalised, and concentration at the EC-level will fall, i.e. firms can no longer extract monopoly rents from their home markets. As prices fall, domestic consumers switch to home output and intra-EC trade declines. The decline in market power and prices results in a fall in profits, which, with exit, induces firms to leave the market. Economies of scale are reaped by the remaining firms due to both the increase in demand and the exit of firms.

In their actual simulations, Smith and Venables consider a situation where there are six countries, France, Germany, Italy, the UK, the rest of the EC and the rest of the world. The focus is on ten NACE 3-digit industries, none of which relate to the food sector, and in order to calibrate the model they use external data on production, trade flows, Herfindahl indices, estimates of scale economies and elasticities of demand. As is often the case with simulation models, the data required tend to be patchy and so arbitrary estimates have to be used. The results indicate that the welfare gains from market integration are much greater than those from the removal of trade barriers. Also, the gains are greater where markets are more concentrated and firms act non-competitively, i.e. Cournot behaviour.

Turning to the Commission's estimates of market integration, it is useful to consider **method 2** first where the total gains from scale economies and competition are measured. The impact of economies of scale was calculated from models developed by Schwalbach (1988) and Ranci and Helg (1988) which focus on the gap between existing plant sizes and minimum efficient scale, estimates of the latter being based on those made by Pratten

(1987). It is important to note that Pratten's estimates were largely based on data from the 1960s and relate to either the UK, the US or Germany. The results for the food industry suggest that at a scale 50 per cent below minimum efficient scale, costs rise in the range 3.5 to 21 per cent (depending on the product), whilst for drink and tobacco, the range is 1 to 6 per cent. The parameters used to pick up the effects of scale economies in the food sector are shown in Table 9.

Table 9 Economies of Scale Parameters for EC Food Industry

Product	Economies of Scale (i)	Economies of Scale (ii)
Meats, Preserves	0.04	1.6
Dairy Products	0.04	1.6
Other Food	0.04	1.6
Beverages	0.04	1.6
Tobacco Products	0.03	1.6

Source: EC Commission
(i) % reduction in cost for a 1% increase in output, given existing plants, i.e. measures changes in variable input productivity
(ii) % reduction in costs due to restructuring as plants closer to minimum efficient scale are built.

Given these estimates, it is argued that market integration will have a more pronounced effect where potential economies are large, seller concentration is high and non-tariff barriers protect inefficient firms. Taking the latter as a base, i.e. the direct gains from 1992, the Commission calculated scaling coefficients for the market integration effects, the coefficients increasing in concentration and scale economies. The values of these

coefficients for the food industry are shown in Table 10, based upon the assumption of free exit by firms after 1992. These coefficients are derived from an extrapolation of Smith and Venables' results, consequently they have to be treated with a good deal of caution as none of their sample industries are closely related to food manufacturing. Also included in this table are the scaling coefficients for **method 1**, where only the effects of increased competition are considered, i.e. the values are lower. Again they are based on Smith and Venables and should therefore be treated with care.

Table 10 Scaling Coefficients for Effects of Market Integration on EC Food Industry

Product	Method 1	Method 2
Meats, Preserves	0.5	1.0
Dairy products	1.5	2.0
Other Food	1.5	2.0
Beverages	1.5	2.5
Tobacco Products	5.0	5.5

Source: EC Commission
Method 1: Ratio of gains from increased competition to gains from removal of barriers
Method 2: Ratio of gains from scale economies and increased competition to gains from removal of barriers.

Given **methods 1** and **2**, Table 11 contains the welfare effects of market integration for the EC food industry. The important point to note about the results in this table is that **method 1** generates higher estimates of the total gain than **method 2.** Also, the relatively higher gains for "other food products" are presumably the result of aggregation.

Table 11 Welfare Effects of Market Integration on EC Food Industry (billion ECU)

Product	Economies of Scale	Increased Competition	Method 1 Total	Method 2 Economies of Scale and Increased Competition
Meats, Preserves	0.9	0.2	1.1	0.5
Dairy Products	1.1	0.8	1.9	1.1
Other Food	3.1	1.8	4.8	2.4
Beverages	1.0	0.5	1.5	0.9
Tobacco Products	0.5	0.9	1.5	1.0

Source: EC Commission.

A number of criticisms can be levelled at the Commission's estimates (see Peck). First, it is assumed that economies of scale will be realised, exit will occur and that markets will move to equilibrium. However, it is difficult to see how disequilibrium can be satisfactorily handled in a simulation model. Second, the Commission reports only those estimates based upon Cournot behaviour, variable firm numbers and complete integration. Although the choice of Cournot behaviour can be defended on technical grounds[23], the sensitivity of the results to changes in assumptions about oligopolistic behaviour, freedom of exit and so on, is symptomatic of the new literature on trade and imperfect competition[24]. Therefore, the Commission's estimates probably need to be treated as upper bounds of the welfare gains from integration.

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[23] Kreps and Scheinkman (1983) have shown that in a two-stage game, Bertrand pricing can be consistent with Cournot outcomes.

[24] See Krugman (1986) for an accessible survey.

(c) The Total Effects of 1992

In concluding this discussion of the microeconomic effects of 1992, Table 12 reports the results for the EC food industry of summing the welfare effects due to removal of trade barriers and market integration. Overall, depending on the method used to calculate the impact of market integration, the welfare effects of 1992 in the food industry range between 13.1 and 18.2 billion ECU in 1985 prices, and in the case of **method 1**, the gains from integration outweigh those from removing trade barriers. These welfare gains account for 9 per cent of the total estimated gains to the EC from 1992, which seems rather high.

Table 12 Total Welfare Effects of 1992 on EC Food Industry (billion ECU)

Product	Stages 1 + 2	Stage 1 + 2 + Method 1	Stage 1 + 2 + Method 2
Meats, Preserves	1.8	2.9	2.3
Dairy Products	2.0	3.9	3.0
Other Food	2.7	7.6	5.1
Beverages	0.5	2.0	1.4
Tobacco Products	0.3	1.8	1.3
Total Food	7.3	18.2	13.1
Food/All Sectors (%)	9.1	9.7	9.3

Source: EC Commission
Stages 1 and 2 refer to the removal of trade barriers.

4. Summary and Conclusions

In summary this paper has reviewed the available results on the possible effects of 1992 on the EC food industry, and also the conceptual basis for these results. Essentially a

distinction has been made between the macro and microeconomic effects of the completion of the internal market. In terms of the macro effects, expected growth in EC GDP over the medium-term will shift the aggregate demand for food. A crude, "back-of-the-envelope" calculation suggests that the increase might lie anywhere between a 1.5 and 9.7 per cent increase in EC food industry sales. In the case of the micro effects, the most comprehensive study to date has been undertaken by the European Commission, who have focussed on both the direct impact of removing trade barriers and the effects of market integration. Overall, their estimates suggest that the welfare gains from 1992 in the food industry lie in the region of 13.1 to 18.2 billion ECU.

As outlined in the review, there are many criticisms that can be levelled at the Commission's study, but in many ways an estimate of the Community-wide gains from 1992 is such a large task that it becomes somewhat of a "straw man". Hence it is critical to consider how the estimates of the impact of 1992 on the food industry can be improved, particularly as they relate to US-owned firms:

- first, more robust estimates of the effect of an increase in EC GDP on food industry demand need to be developed, particularly at the EC member level.

- second, whilst gains in intra-EC food trade have been predicted, no effort has been made to model the extent to which these gains will accrue to multinationals based in the EC. As Tironi (1982) has shown, the distribution of gains and losses from removal of trade barriers can be affected by the existence of foreign capital and also the nature of any profits tax regime. Assuming a degree of market imperfection, he identifies two effects; first, in an importing country where the domestic firms are foreign subsidiaries, there is a **foreign profit**

diversion effect as cheaper imports from the rest of the EC replace goods produced by foreign capital. This results in both an increase in consumer surplus and a redistribution of income to the importing country, although the size of these effects will depend on the extent to which the multinational rents were taxed *ex ante*. Second, in an exporting country, there is a **foreign profit creation effect** as multinationals involved in trade benefit from the removal of trade barriers. Again depending on the tax regime, this may represent a loss in national income to the exporting country. Given the leading market position of US food multinationals in many EC countries, this is a critical area of research.

- third, the EC estimates of the effect of removing internal trade barriers on extra-EC imports have been set at zero. The validity of this assumption needs to be examined as it has clear implications for the effect of 1992 on US food exporters.

- fourth, there is debate over whether 1992 will lead to the removal of MCAs and the effect such removal will have on agricultural and food prices. *A priori*, it would seem that the impact of 1992 on the EC food industry will be highly sensitive to whether or not MCAs are included. If removal of MCAs is more dependent on reform the CAP, then the outcome of the current GATT negotiations becomes critical.

- fifth, the EC Commission's estimates of the impact of market integration on the food industry are based on an extrapolation from Smith and Venables' simulation model. This is clearly unsatisfactory and there is a need for both a more thorough survey of the industrial organisation of the EC food industry and modelling of the effects of market integration.

References

Baldwin, R. (1989) "On the Growth Effects of 1992", **Economic Policy, 5**, 248-281.

Cawley, R. and Davenport, M. (1988) "Partial Equilibrium Calculations of the Impact of Internal Market Barriers in the European Community" in **Research on the "Cost of Non-Europe", Basic Findings**, Luxembourg: Commission of the European Community.

Cox, D. and Harris, R. (1985) "Trade Liberalisation and Industrial Organisation: Some Estimates for Canada", **Journal of Political Economy, 93**, 114-145.

Dixit, A. and Stiglitz, J. E. (1977) "Monopolistic Competition and Optimum Product Diversity", **American Economic Review, 67**, 297-322.

Dornbusch, R. (1989) "Europe 1992: Macroeconomic Implications", **Brookings Papers on Economic Activity, 2**, 341-362.

Euromonitor (1990) **European Food Companies**, London: Euromonitor.

European Commission (1985) **Completing the Internal Market**, White Paper, Brussels: Commission of the European Community.

European Commission (1988) "The Economics of 1992", **European Economy", 35**, Luxembourg: Commission of the European Community.

Ichter, R. (1990) "Impacts of 1992 on the European Agro-Food Sector", **Organisation and Performance of World Food Systems: NC-194**, Occasional Paper, OP-10.

Josling, T. (1990) "Completion of the Internal Market: Implications for non-EEC Countries", **Food Policy, 15**, 152-160.

Kreps, D. and Scheinkman, J. (1983) "Quantity Pre-Commitment and Bertrand Competition Yield Cournot Outcomes", **Bell Journal of Economics, 14**, 326-338.

Krugman, P. (1979) "Increasing Returns, Monopolistic Competition and International Trade", **Journal of International Economics, 9**, 469-79.

Krugman, P. (1980) "Scale Economies, Product Differentiation and the Pattern of Trade", **American Economic Review, 70**, 950-959.

Krugman, P. (1986) **Strategic Trade Policy and the New International Economics**, Cambridge, MA: MIT Press.

Norman, V. (1989) "Trade Policy under Imperfect Competition", **European Economic Review, 33**, 473-479.

Peck, M. J. (1989) "Industrial Organisation and the Gains from Europe 1992", **Brookings Papers on Economic Activity, 2**, 277-299.

Pratten, C. (1988) "A Survey of Economies of Scale", in **Research on the "Cost of Non-Europe", Basic Findings**, Luxembourg: Commission of the European Community.

Ranci, P. and Helg, R. (1987) **Economies of Scale and the Integration of the European Economy: The Case of Italy**, Brussels: Commission of the European Community.

Romer, P. (1987) "Growth Based on Increasing Returns to Scale Due to Specialisation", **American Economic Review, 77**, 56-62.

Schwalbach, J. (1988) "Economies of Scale and Intra-Community Trade", in **Research on the "Cost of Non-Europe", Basic Findings**, Luxembourg: Commission of the European Community.

Shaked, A. and Sutton, J. (1983) "Natural Oligopolies", **Econometrica, 51**, 1469-1483.

Smith, A. and Venables, A. J. (1988) "Completing the Internal Market in the European Community", **European Economic Review, 32,** 1501-1525.

Swinbank, A. (1990a) "Brave Attempt at an Impossible Task", **Food Policy, 15,** 176-177.

Swinbank, A. (1990b) "Implications of 1992 for EEC Farm and Food Policies", **Food Policy, 15,** 102-110.

Tironi, E. (1982) "Customs Union Theory in the Presence of Foreign Firms", **Oxford Economic Papers, 34,** 150-171

Venables, A. J. (1989) "The Growth Effects of 1992-Panel Discussion", **Economic Policy, 5,** 273-275.

Venables, A. J. and Smith, A. (1986) "Trade and Industrial Policy under Imperfect Competition", **Economic Policy, 2,** 622-671.